THIRD LETTER REPORT ON EVALUATION (U)

(13 January 1966 to 14 February 1966)

[redacted]

14 February 1966

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I. Work for Reporting Period

During the past month work has continued on completing two-pinhole interferometer to measure the degree of coherence in the object plane. We are now experimenting to determine whether fiber optics probes having a fixed output spacing and variable separation input spacing will enable us to measure the degree of coherence at various pinhole spacings and thus avoid the complexities of determining the visibility of very high spatial frequency fringes. This also provides flexibility in locating the fringe detector unit outside the confines of the object plane region. The fabrication of the 35mm 200' magazine adapter for use at the image plane has been completed. We are now using it to obtain optimum focus position, exposure data and paraxial resolution for both the He-Ne and Na sources. The [redacted] 25X1 people arrived on 7 February to realign the optics but have not yet completed their work due to lack of a proper alignment target which they are awaiting delivery on from [redacted] 25X1

The theoretical work completed during the past month includes the following. A calculation of the partially coherent images of one dimensional three bar targets of various contrasts has now been completed to the point where it is ready for final numerical evaluation on the 7090 computer. The computer program is now being written.

It has been determined that the partially coherent imaging technique will be applicable to the problem of measuring the coherence interval of the object illumination. It will be necessary to stop down the first imaging lens so that the system will closely approximate a diffraction limited system. This imaging work will also be done on axis.

II. Work for Next Period

The calculation and recording of images of low contrast objects will be continued. A series of low contrast objects, (edges and three bar targets) will be examined using both the sodium and laser sources to create varying degrees of spatial coherence in the object plane. For this low contrast series the system should act as a linear system, independent of the degree of coherence of the illumination. The series will be repeated for increasing target contrasts and the shift from a linear to a non-linear imaging system examined and evaluated.

During this next reporting period [redacted] representatives will return to realign the enlarger and thus obtain better symmetry of aberrations in the image plane. For our present work this lack of symmetry should not affect our paraxial imaging experiments. 25X1

III. Visits to Contractor

During this reporting period we made no visits to the contractor. Messrs. [redacted] spent one day (7 February) at T/O for preliminary alignment work on the enlarger. They expect to return within 2 weeks to complete their alignment work. 25X1

IV. Changes in Personnel 25X1

[redacted] has been added to the program staff.

V. Progress of Work

As of this reporting date approximately 16% of the work program has been completed and 19% of the contract funds have been expended. Now that the enlarger checkout, camera back modifications, and computer programming are essentially completed we expect that the completion rate will be substantially increased. No delays in completing the contracted program within funds or within specified completion dates are anticipated.